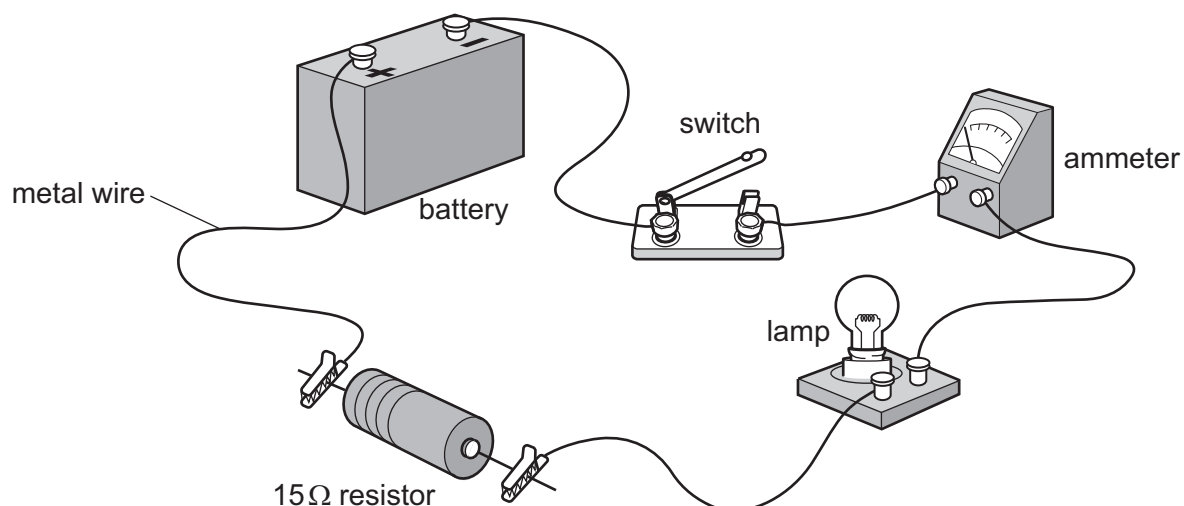


- 1 The diagram shows an electric circuit set up by a student.



The current in the 15Ω resistor in the diagram is 0.40 A when the switch is closed.

Calculate the potential difference (p.d.) across the 15Ω resistor.

p.d. across resistor = V [3]

[Total: 3]

- 2 The electric starter motor in a car is switched on and off using a relay.

The power of the starter motor is 1.8 kW and it is also operated by the 12 V car battery.

Calculate the current in the starter motor when it is used.

current = [2]

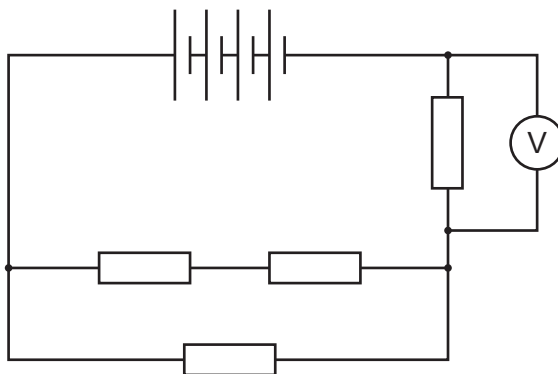
[Total: 2]

- 3 A battery consists of four cells, each of e.m.f. 1.2 V , in series.

(a) Calculate the e.m.f. of the battery.

e.m.f. = [1]

(b) The battery is connected in a circuit with four $12\ \Omega$ resistors as shown in the circuit diagram.



Calculate the total resistance of this arrangement of resistors.

resistance = [3]

(c) Calculate the reading on the voltmeter in the circuit diagram.

reading = [2]

[Total: 6]

- 4 The unit of the two electrical quantities electromotive force (e.m.f.) and potential difference (p.d.) is the volt (V).

State **one** other similarity between e.m.f. and p.d.

.....

..... [1]

[Total: 1]

- 5 The electric starter motor in a car is switched on and off using a relay.

The relay consists of a plastic case and two flexible springy strips, X and Y, which are made of soft iron. These iron strips act as the switch when a circuit is connected between the terminals W and Z.

Diagram A shows X, Y and the plastic case.

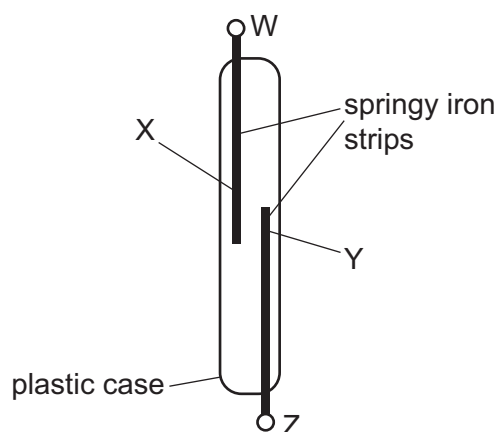


Diagram A

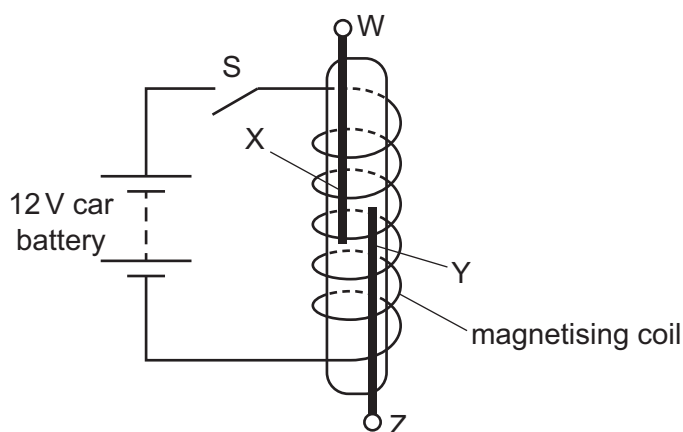


Diagram B

Diagram B shows the equipment from diagram A inside a magnetising coil. The magnetising coil is in series with the 12 V car battery and switch S, which is open.

The starter motor circuit is connected between terminals W and Z.

Explain why copper wires with a large cross-sectional area are used for this circuit.

.....

.....

.....

[2]

[Total: 2]

- 6 The unit of the two electrical quantities electromotive force (e.m.f.) and potential difference (p.d.) is the volt (V).

State **one** difference between e.m.f. and p.d.

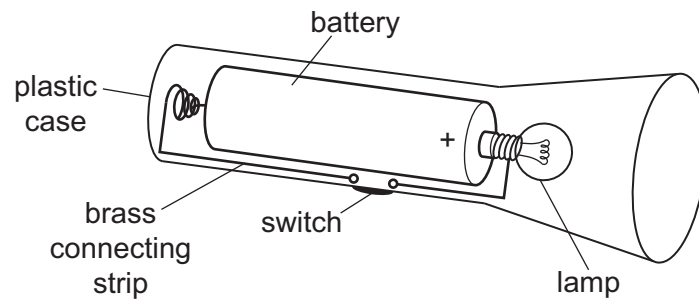
.....

.....

[1]

[Total: 1]

- 7 A student has a battery-operated torch. The diagram shows the electrical components in the torch circuit.



When the torch is switched on, the potential difference (p.d.) across the lamp is 1.4 V and the current in the lamp is 0.26 A.

(a) State the current in the brass connecting strip.

current = A [1]

(b) Calculate the resistance of the lamp.

resistance = Ω [3]

[Total: 4]

8 State a quantity that a voltmeter measures.

..... [1]

[Total: 1]